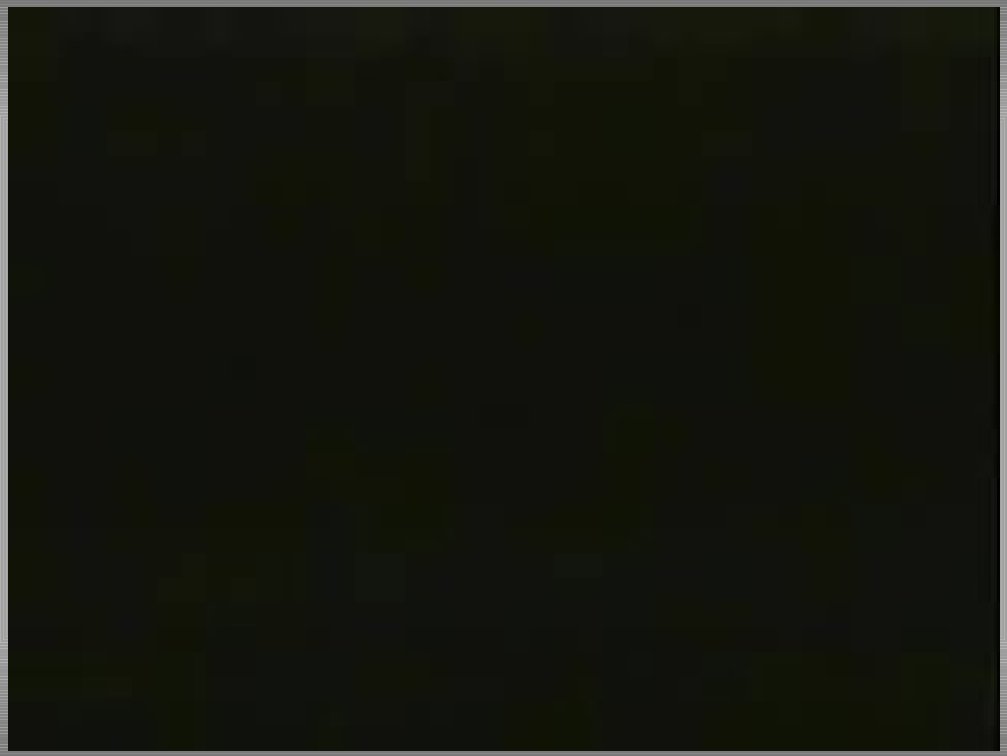
Aircraft Repair and Supply Center

Unique Identifier (UID)
2D Barcoding Project

UNITED STATES COAST GUARD 1790

U S COAST GUARD

UID / 2D BARCODING
Datamatrix Symbol



DEPT OF DEFENSE

USCG

NASA MARSHALL SPACE CENTER

Partners in the future development of "UID"

ARSC

MARCH 2005

DEFINITION

UID: IS A NEW GLOBALLY UNIQUE "PART IDENTIFIER" CONTAINING DATA ELEMENTS USED TO TRACK PARTS THROUGHOUT THEIR

United States Coast Guard

Aircraft Repair And Supply Center

2D Barcoding UID Programs

Background : *Started June 1996

***June 1997 Phase I: Installed 2D Barcoding labels on 500 HH-65 Flight Safety Critical Aircraft Parts (FSCAP)**

***June 1998: Integration of the USCG "AMMIS" computer program for logistics with the**

2D Barcoding UID Programs (cont'd)

*** December 2002: Phase II included the "Permanent Direct Part Marking" of an additional 500 FSCAP items from the HH-60J, HC-130J and HU-25 aircraft.**

***February 2005: Signing of the MOU between NASA, DoD/OSD, and the USCG ARSC**

2D BARCODING

Program Benefits

- **Tamper – resistance; prevents duplication.**
- **Will provide more solid evidence of criminal conduct thus ensuring a better chance of prosecution and conviction.**
- **Automatically capture and update historical data for any given part.**
- **Eliminate human error when capturing part identification.**
- **Has the ability to provide readable markings on very small parts, and internal engine and gearbox parts.**
- **Portable data readers (don't have to remove part from aircraft to review history)**
- **Accumulate part history in a central or national database. The FAA, DOT and the Aircraft Transportation Association (ATA) are addressing this issue.**

2D BARCODING

Additional Benefits Include:

- **Improve inventory / logistics management**
- **Improve ability to trace parts**
- **Improve flight and aviation maintenance**
- **Improve operations efficiency which in turn will reduc overall cost and improve scheduling**

MILESTONES

The program has been marked by a number of technica
These included but are not limited to the following:

- **The first use of a fully integrated mobile marking cart**
- **The first use of a hand held laser to mark products in**
- **The first use of the laser bonding process to mark FS**
- **The first use of color additives in conjunction with dee chemical etch and laser coating removal processes to marking contrast.**
- **The first read through paint markings applied to comm products.**

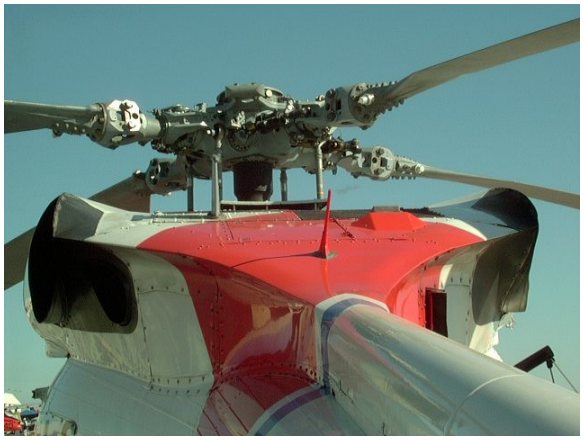
Marking Processe

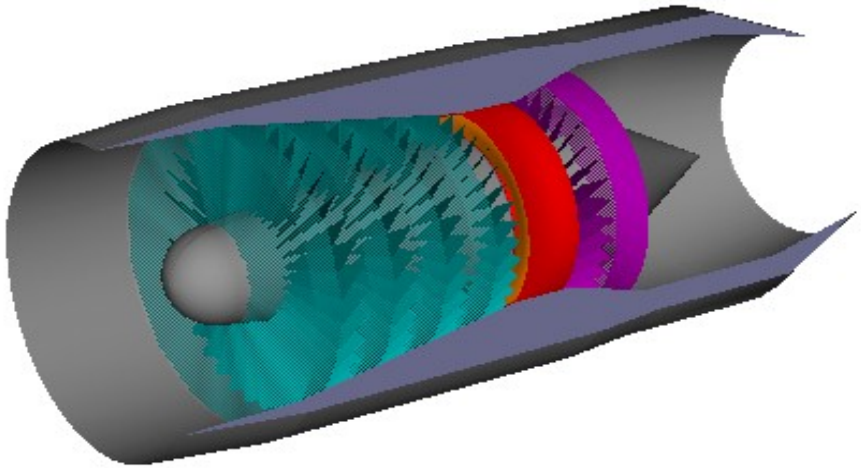
Approved marking processes (as-defined by NASA-STD-6002 & MIL-STD-130 - Draft)

- **Decals**
- **Dot Peen**
- **Electro-Chemical Coloring**
- **Micro-Milling**
- **Ink Jet**
- **Laser Coat & Discolor**
- **Laser Coat & Remove Process**
- **Stencil (ink and paint)**
- **Gas Assisted Laser Etch**
- **Deep Dot Peening (>.004-inch deep)**
- **Laser Bonding**
- **Laser Engineered Net Shaping (LENS)**
- **Laser Engraving**
- **Laser Inducted Surface Improvement (LISI)**

Types of Parts that were Marked

- Airframe and structural components
- Gear boxes and rotor components
- Internal and external engine components





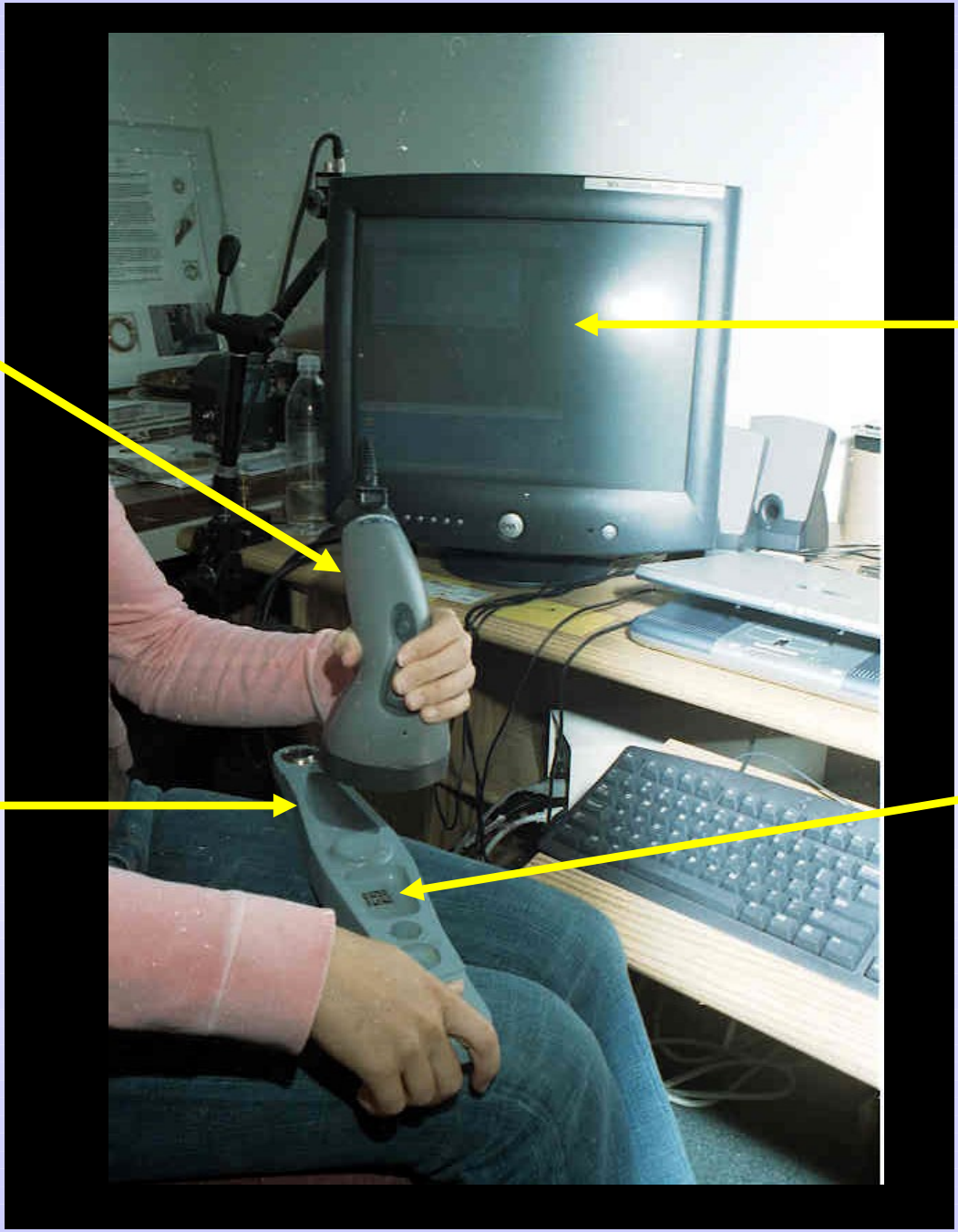
New Technology Applications

The Dataline team shall arrange for the demonstration of new AIT technologies.

- **Mobile Marking Carts**
- **Portable Vacuum Arc Vapor Deposition Marker**
- **Read-through-paint (RTP) Readers**
- **Strain Measurement System**

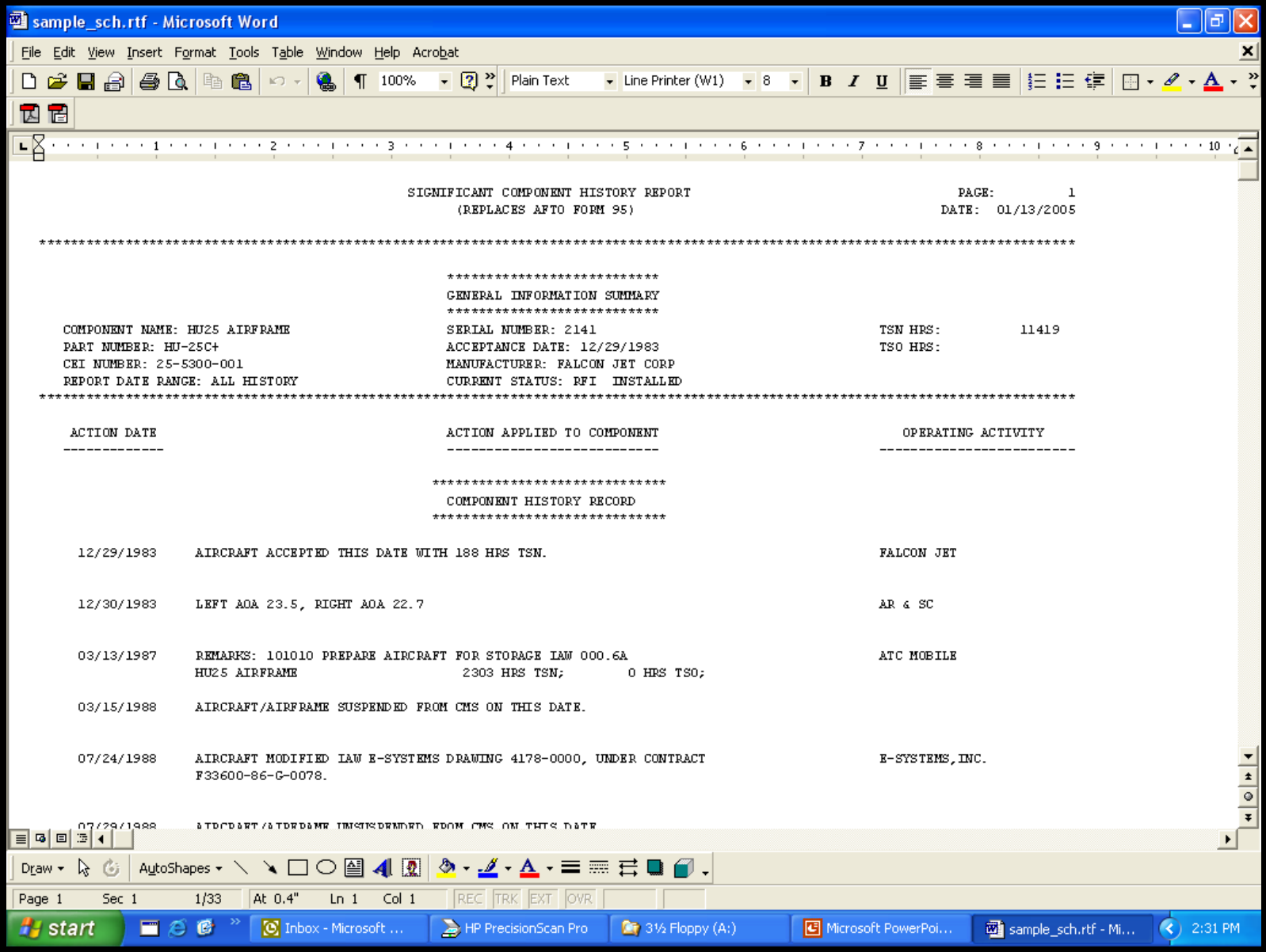
MXi Reader

USCG FSCAP Part



Mark Verification Data

2D Datamatrix Barcode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SIGNIFICANT COMPONENT HISTORY REPORT
(REPLACES AFTO FORM 95)
PAGE: 1
DATE: 01/13/2005
GENERAL INFORMATION SUMMARY
COMPONENT NAME: HU25 AIRFRAME
PART NUMBER: HU-25C+
CEI NUMBER: 25-5300-001
REPORT DATE RANGE: ALL HISTORY
SERIAL NUMBER: 2141
ACCEPTANCE DATE: 12/29/1983
MANUFACTURER: FALCON JET CORP
CURRENT STATUS: RFI INSTALLED
TSN HRS: 11419
TSO HRS:
ACTION DATE
ACTION APPLIED TO COMPONENT
OPERATING ACTIVITY
COMPONENT HISTORY RECORD
12/29/1983 AIRCRAFT ACCEPTED THIS DATE WITH 188 HRS TSN. FALCON JET
12/30/1983 LEFT AOA 23.5, RIGHT AOA 22.7 AR & SC
03/13/1987 REMARKS: 101010 PREPARE AIRCRAFT FOR STORAGE IAW 000.6A ATC MOBILE
HU25 AIRFRAME 2303 HRS TSN; 0 HRS TSO;
03/15/1988 AIRCRAFT/AIRFRAME SUSPENDED FROM CMS ON THIS DATE.
07/24/1988 AIRCRAFT MODIFIED IAW E-SYSTEMS DRAWING 4178-0000, UNDER CONTRACT E-SYSTEMS,INC.
F33600-86-G-0078.
Draw
AutoShapes
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HP PrecisionScan Pro
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Microsoft PowerPoi...
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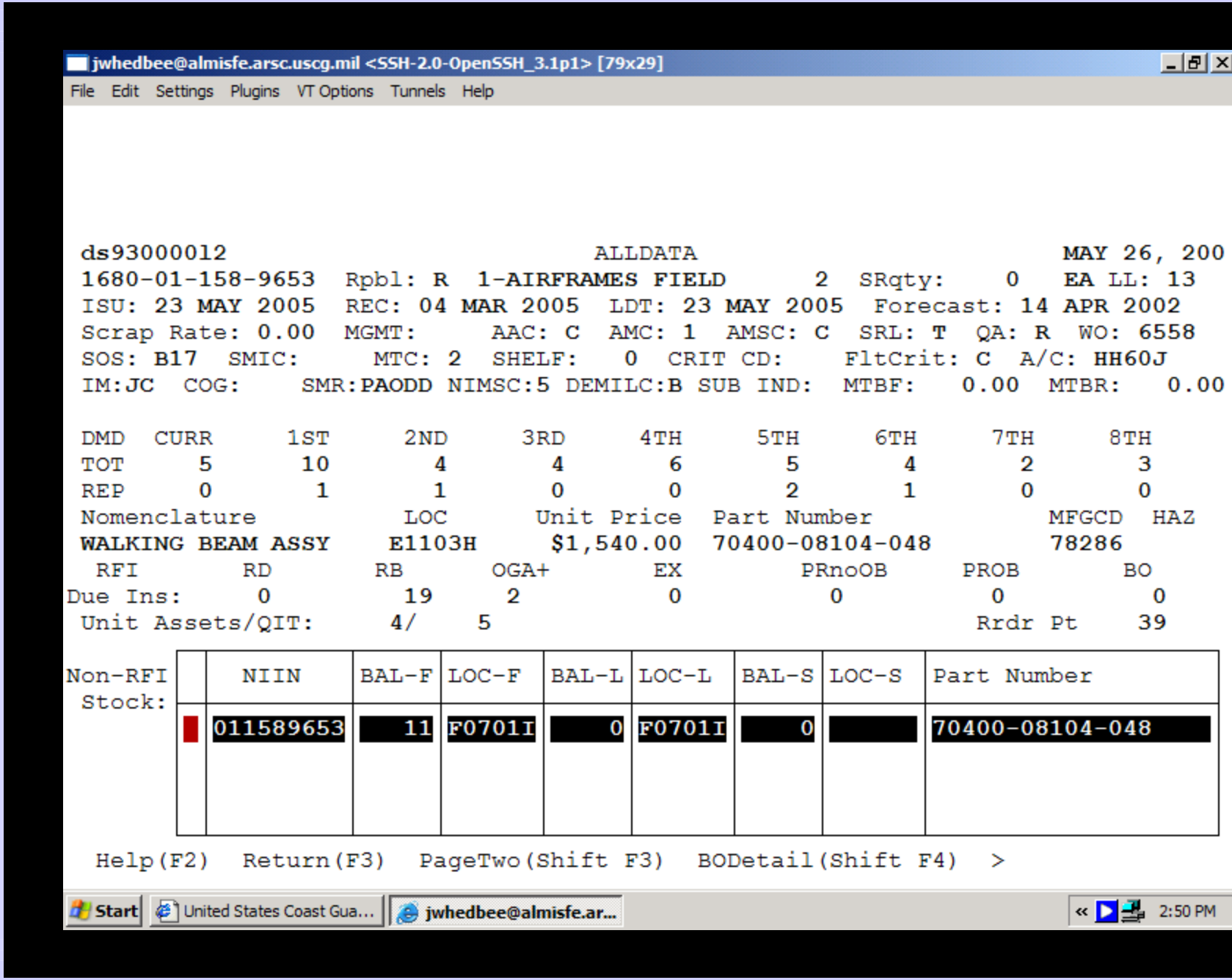
jwhedbee@almisfe.arsc.uscg.mil <SSH-2.0-OpenSSH_3.1p1> [79x29]
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1680-01-158-9653 Rpbl: R 1-AIRFRAMES FIELD 2 SRqty: 0 EA LL: 13
ISU: 23 MAY 2005 REC: 04 MAR 2005 LDT: 23 MAY 2005 Forecast: 14 APR 2002
Scrap Rate: 0.00 MGMT: AAC: C AMC: 1 AMSC: C SRL: T QA: R WO: 6558
SOS: B17 SMIC: MTC: 2 SHELF: 0 CRIT CD: FltCrit: C A/C: HH60J
IM:JC COG: SMR:PAODD NIMSC:5 DEMILC:B SUB IND: MTBF: 0.00 MTBR: 0.00
DMD CURR 1ST 2ND 3RD 4TH 5TH 6TH 7TH 8TH
TOT 5 10 4 4 6 5 4 2 3
REP 0 1 1 0 0 2 1 0 0
Nomenclature LOC Unit Price Part Number MFGCD HAZ
WALKING BEAM ASSY E1103H $1,540.00 70400-08104-048 78286
RFI RD RB OGA+ EX PRnoOB PROB BO
Due Ins: 0 19 2 0 0 0 0
Unit Assets/QIT: 4/ 5 Rrdr Pt 39
Non-RFI Stock:
NIIN BAL-F LOC-F BAL-L LOC-L BAL-S LOC-S Part Number
011589653 11 F0701I 0 F0701I 0 70400-08104-048
Help(F2) Return(F3) PageTwo(Shift F3) BODetail(Shift F4) >
Start
United States Coast Gua...
jwhedbee@almisfe.ar...
2:50 PM

This slide depicts the form that has been developed specifically for this project. Not only does it establish all of the pertinent data for each part; but also shows an actual photo of the part and will also show the

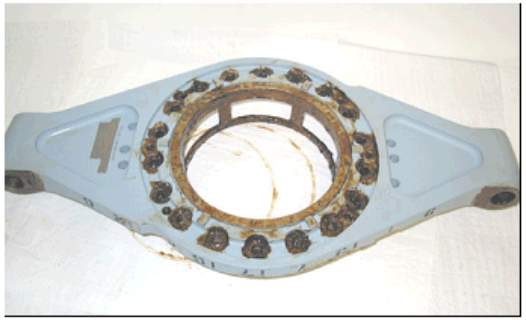
USCG FSCAP DPM DATA SHEET

Part 1: Part Identification

FSC: 1615	NIIN: 012212613	Assy No.: 70103-08103-047	Assy. S/N: 00031
Nomenclature: PRESSURE PLATE ASSY			
Aircraft Type: HH60J		Aircraft Manufacturer: Sikorsky	

Part 2: Part Attributes

Material Family (supplied by USCG): Reactive & Refractory Metals		
Material Type (supplied by USCG): Ti Gr 6AL, 4V		
UNS Number: R56400	Hardness: 331 Brinell, 36R Rockwell	Thickness: ½-inch
Machinability:	Melting Temperature Range: 3000F	
Coatings (supplied by USCG):		
Surface Roughness (ANSI/ASME B46.1): 20	Microfinish Comparator Used: ANSI C-9	
Grey Scale Value: N/A	Color: Blue-Gray – Fed Std 16329	
Geometry: Flat	Available Marking Area: 2-inch x ¾-inch	
Corrosion Protection Method Used (supplied by USCG): None		



Photograph of Part

Photograph of Current Part ID Marking

Part 3: Marking

Current Marking Method(S): Ink marker & vibro-peen with clear coat applied to stripped area

Part 4: Operational Environments (supplied by USCG)

Abrasion:	Chemical Exposure: (Oil, Fuel & Hydraulic Fluid):	UV Exposure:	Salt (Spray, Splash & Emersion): Yes

2D Barcoding

Current Update

During the period of Feb – Mar 2005 the US Coast Guard continued its efforts to study and gain ground in the 2D Symbology Technologies. During Phase II of the project some 500 parts were permanently marked with several methods of marking. As the Coast Guard continues to put forth efforts to lead the way in current technologies, they continue to study and document the facts discovered during these testing phases.

Recently evaluated were 52 aircraft parts that were assigned at ARSC. These parts had been removed from aircraft for maintenance (Non-RFI), returned from overhaul (RFI), or currently installed on aircraft in for maintenance (PDM).

The types of parts that were evaluated were mechanical, hydraulic, avionics, engine / gearbox. The types of markings that were evaluated were Laser Etch, Laser

2D BARCODING

The following notes are an overview of evaluation results:

All laser etching marks remain Grade "A"

- **All dot peen read Grade "A" once the new paint was removed**
- **Rastoring showed signs of degrading from the overhaul process but still received a Grade "B". Degrading occurred in the "Contrast" element of the evaluation.**
- **Laser bonding showed Grade "A" with a remarkable trait: The parts that are in a heavy hydraulic environment indicated 0 degradation for the label and adhesive. These parts have been installed and flown 97 and 102 hrs respectively.**
- **Tamper resistant labels in the avionics remained intact (2 parts thru overhaul) and a remarkable note is that we applied the same label to several main and tail rotor blades**

DOD / OSD POLICY

UID: MIL-STD 130L – approved for release Oct 2003

- Mandatory UID DFARS clause to be included in all new solicitations and contracts issued after January 01, 2004.
- UID must be applied to items that are serialized within DoD today or already have data plates.
- Effective January 01, 2006 all government furnished property (GFP) must meet the UID Policy Requirements.
- All programs must complete marking of items and all applicable embedded assets within items by

UID Identification

Recommendation from DHS:

DHS: 7009

USCG: 4329

TSA: 2387

Serialized numbers in the que: example B479832Q3

Example of Marking UID:

USCG PART: 7009 4329 B479832

DHS USCG Serialized Number

UID Identification

Recommendation from DoD / OSD

Construct #1

Issuing Agency Code: D

Enterprise Identifier (MFR Cage): 0CVA5

Serial Number: 786950

Example: D 0 C V A 5 7 8 6 9 5 0

IAC **EID** **Serial Number**

UID
Identification

Recommendation from DoD / OSD

Construct #2

Issuing Agency Code (IAC): UN

Enterprise Identifier (MFR Cage): 194532636

Orig. Part Number: 1234

Serial Number: 786950

Example: U N 1 9 4 5 3 2 6 3 6 1 2 3 4 7 8

IAC

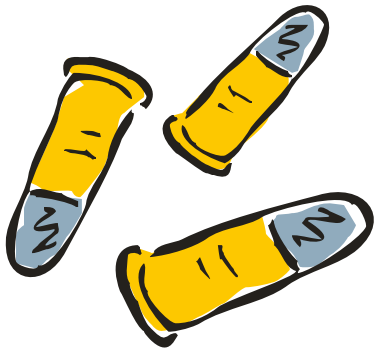
EID

ORIG PART NUMBER

SERIAL NUMBER

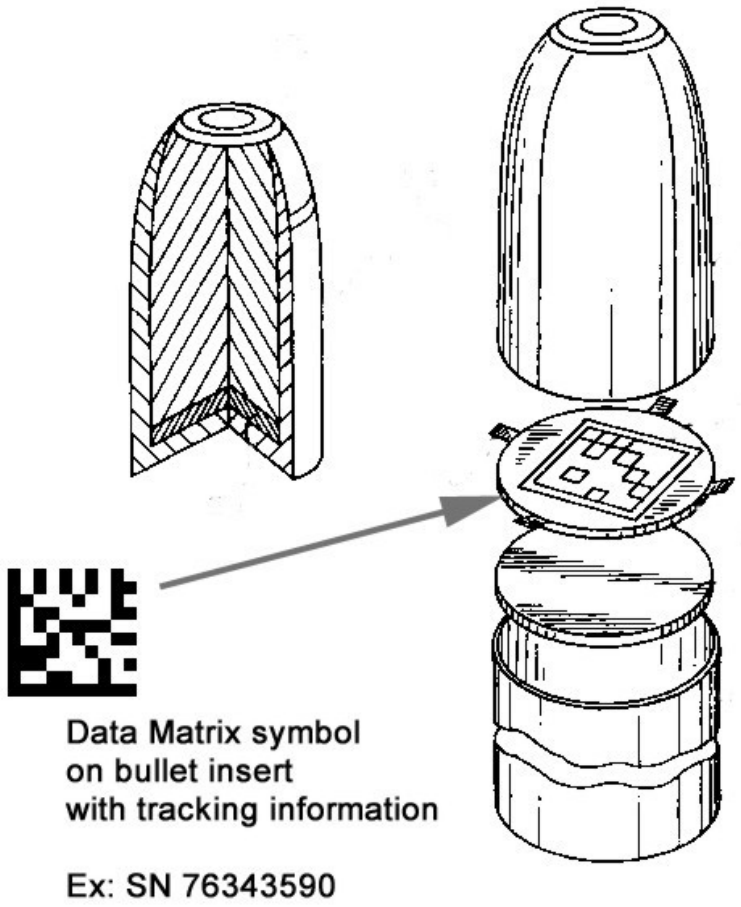
MARKING AMMUNITION

Over six hundred 9mm rounds have been marked and test fired. After firing into brick walls, water, wood, etc; the barcodes were still readable.



Bullet Marking

- Project initiated by Secret Service
- Need to link spent bullets to shooter
- Goal accomplished by adding 2-D sy
  insert into bullet during manufacturi
  US Patent Number 5698816
- Insert placed between jacket and co
- Markings survive discharge and impa
- Ammunition lots assigned to individu
  Agents

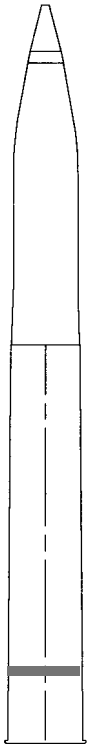


Small Arms

- Project initiated by U.S. Army
- Provides means to automate inventc and issuance
- Symbols applied in arms rooms on-site using mobile laser
- Marking process tested and approved by U.S. Army Armament Research and Development Center (AMSTA-AR-ESW-S), Rock Island, Illinois

5-Inch Shell Casing Marking

- Project initiated by U. S. Navy and supported by United Defense, RVSI and Ferro Corporation
- 2-D Symbols need to support MK45 Mod 4 ammunition auto-loading system
- Markings applied using Laser bonding process - Metal power fused to surface using the heat generated by a laser beam.



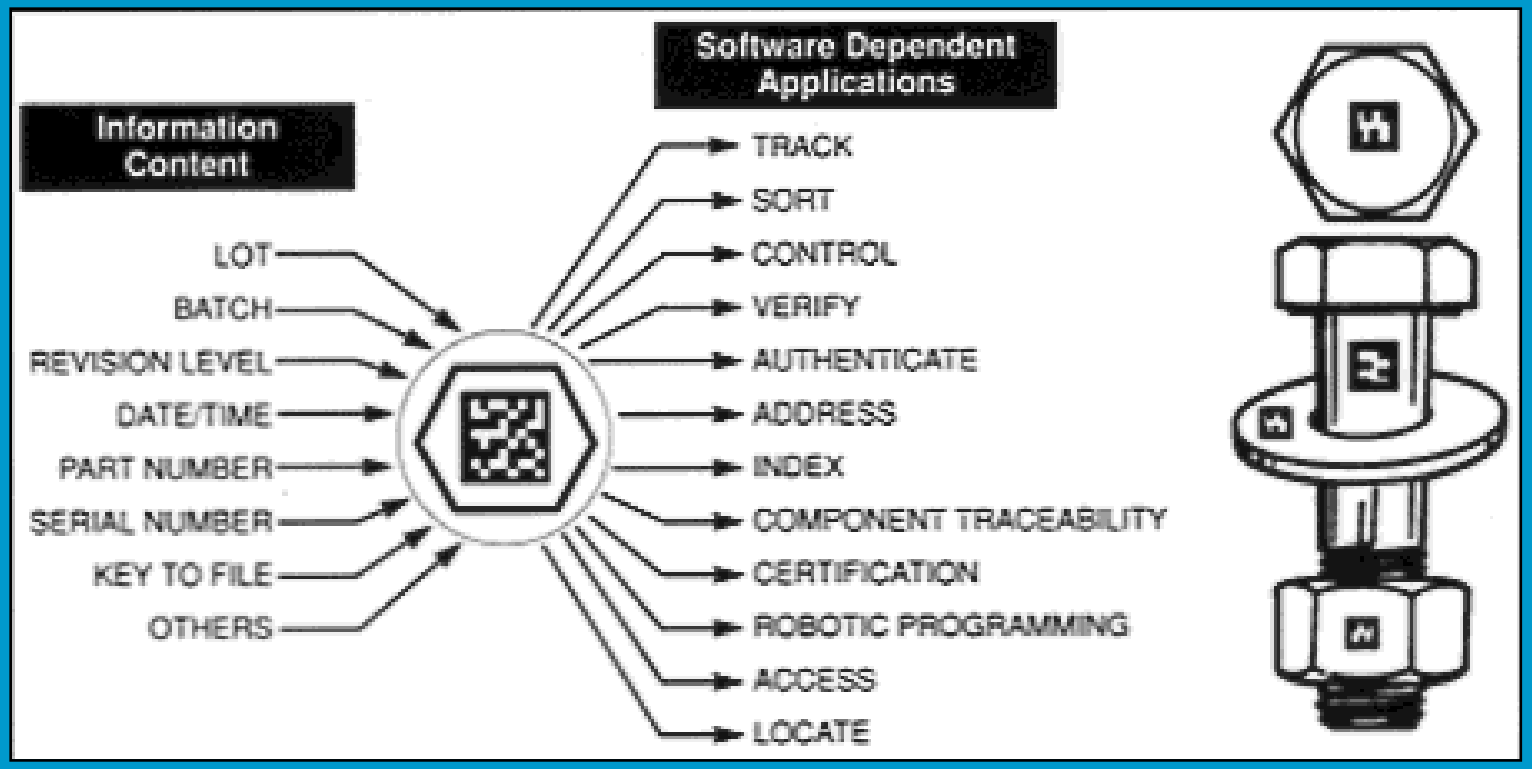
ERGM Projectile

Radio Control Set with Datamatrix Label Bar-code recently implemented by Rockwell Collins

2D Barco de Label

What’s in the future?

- 2D Barcode project



CONCLUSIO

In conclusion, the US Coast Guard is aggressively pursuing new processes and procedures to help prevent bogus, counterfeit and unapproved parts from entering not only the Coast Guard inventory; but all of the aviation industry as well. As we continue our research and development; the implementation and use of UID / 2D Barcoding will assist in the fight against the acquisition of unapproved parts; and enhance the processes of accountability; maintenance and safety. The US Coast Guard continues to lead the way

Points of Contact

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